BUILDING ENERGY CODES

FY 2006 Efforts Enhance Energy Efficiency in Buildings Nationwide

The U.S. Department of Energy (DOE) strives to improve energy efficiency by encouraging the use of new technologies and better building practices. DOE's Building Energy Codes Program (BECP) works with federal agencies, national code organizations, the building industry, and state and local officials to promote more stringent building energy codes. BECP also provides financial and technical assistance and training to support state energy code activities. This report describes how BECP's efforts helped improve energy efficiency in the nation's buildings during fiscal year (FY) 2006.

Key FY 2006 Activities

BECP's compliance software, codes and standards development work, and technical assistance and training efforts delivered energy savings by helping designers, builders, product manufacturers, and code officials streamline energy code compliance and enforcement. In FY 2006, BECP continued to enhance its software products, updating them to include new model codes and making improvements based on feedback received through BECP's user and technical support systems. Also, BECP worked closely with professional organizations to improve residential and commercial codes and to improve federal energy standards. The BECP website continued to rise in popularity, in part because of its steady addition of resources, such as the award-winning Resource Center, webcasts, and availability of continuing education credits. The audience for BECP's *Setting the Standard* newsletter grew substantially, and BECP reached an even broader group of energy code users by publishing articles and announcements in trade magazines. More details about key FY 2006 activities are outlined in the following sections.

Compliance Software

The compliance software includes RES*check*™, which applies to single-family and low-rise, multi-family dwellings, and COM*check*™, which applies to all other buildings. These products are based on the International Code Council's (ICC's) International Energy Conservation Code (IECC™) or on ANSI/ASHRAE/IESNA[1] Standard 90.1—the national model energy codes that serve as the basis of most state codes. The software packages are supported with accompanying user guides, videos, training materials, and compliance manuals.

COM*check*

BECP made several enhancements to COM*check* compliance tools, including:

- All COM*check* tools were updated to support the 2004 IECC and ASHRAE Standard 90.1-2004.
- State-specific versions of the software were developed to support codes in Georgia, New York, and Vermont.
- The COM*check* Beyond Code Advisor was added to COM*check* and COM*check*-Web.
- A new data-exchange feature allows users to transfer and save files between COM*check*-Web and the desktop tool.
- An AreaCalc prototype user interface was developed for all tools.
- A new COM*check* Software Technical Support Document was posted on the BECP website.
- An option to generate RTF compliance reports was reintroduced in the software, fulfilling a popular user feedback request.

RES*check*

Improvements to RES*check* include:

- All RES*check* tools were updated to support the new National Appliance Energy Conservation Act requirements for air conditioners and heat pumps.

[1] The American National Standards Institute / American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. / Illuminating Engineering Society of North America.

U.S. Department of Energy
Energy Efficiency and Renewable Energy

By 2010, BECP will deliver energy cost

Online Permitting

The online permitting feature in RES*check* and COM*check* allows users to submit electronic compliance forms (PDF) directly to code authorities from the software. **More than 6,000 compliance reports were submitted electronically during FY 2006.**

- BECP developed a prototype version of RES*check* for the 2006 IECC that provides support for simulation-based HVAC tradeoffs.
- A new data-exchange feature allows users to transfer and save files between RES*check*-Web and the desktop tool.
- An option to generate RTF compliance reports was reintroduced in the software, fulfilling a popular user feedback request.

Codes & Standards Development

BECP works closely with the ICC, ASHRAE, IESNA, American Institute of Architects (AIA), and other code user groups to develop more stringent and easy-to-understand building energy codes and to assess potential code barriers to new energy-efficient technologies. BECP codes and standards development activities for FY 2006 are discussed as follows.

BECP submitted code-change proposals in FY 2006, including one regarding leak-tested ducts.

Improving Residential Codes and Standards

BECP was active in the ongoing development of the IECC and the energy chapter of the International Residential Code, both of which are maintained by the ICC. BECP developed the technical basis and code text for 11 residential code-change proposals and one commercial proposal (discussed in the following section). Additionally, BECP worked with other external stakeholders who submitted proposals to improve the codes' treatment of vapor retarders and conditioned attics.

Improving Commercial Codes and Standards

BECP provided technical analysis and participated in the development of six new addenda to ASHRAE Standard 90.1. The proposed addenda, which may be part of Standard 90.1-2007 if approved during public review, include:

- new opaque envelope requirements
- new fenestration requirements
- additional lighting power allowances for retail space
- new occupancy sensor requirements for hotel and/or motel restrooms
- lowered threshold for required use of variable speed drives.

BECP also developed and submitted one code-change proposal to the IECC that enhances the ability of code officials to enforce recently upgraded lighting requirements.

Eliminating Code Barriers to New Technologies and Techniques

Based on a list of code issues encountered by Building America teams and prepared by the National Renewable Energy Laboratory, BECP prepared a prioritized list of recommended residential code-change proposals to be considered for the 2006/2007 ICC code-development cycle. Five proposals designed to eliminate or mitigate code barriers to new technologies were prepared for the

BECP prepared a technical report about energy savings gained by improving the energy code for manufactured homes.

2006 code-development hearings of the ICC. These included improvements in the code's treatment of frost-protected foundations, insulating sheathing, performance tradeoffs for leak-tested ducts, performance tradeoffs for cool roofs, and conditioned crawlspaces.

Researching High-Return Residential Code Changes

BECP continued evaluating the energy, economic, and practical impacts of potential code changes that would make major improvements to home efficiency. The evaluations point to mandatory duct leakage testing as the most promising new code feature to pursue for the 2009 IECC.

Quantifying the Benefits of Home Energy Rating Systems

BECP worked with the Residential Energy Services Network to design energy simulations that will help determine how Home Energy Rating Systems (HERS) relate to compliance with various existing building codes. These simulations will quantify code and beyond-code relationships with HERS.

Improving Federal Energy Standards

Per the requirements of the Energy Policy Act of 2005 (EPAct), BECP developed new federal energy performance standards for both residential and commercial federal buildings and prepared associated environmental assessments for each. These standards include energy performance and cost effectiveness. When final, they will apply to all new Federal and replacement buildings. In addition, BECP prepared a technical report detailing the potential for energy savings from improvements to the U.S. Department of Housing and Urban Development's energy code for manufactured homes.

savings of $520 million per year.

Federal Determinations on Updated Model Energy Codes

BECP conducted residential energy analyses and drafted a technical report to support DOE's legislatively mandated determination as to whether the 2006 IECC saves energy relative to the 2003 edition. On the commercial side, the differences between ASHRAE Standards 90.1-1999, 90.1-2001, and 90.1-2004 were analyzed and a report was prepared to support DOE's legislatively mandated determination of energy savings for ASHRAE Standard 90.1-2004.

Technical Assistance and Training

BECP technical assistance and training activities help inform code officials, designers, builders, and others on developments in building energy codes and standards. These efforts also increase awareness and use of BECP compliance tools and provide valuable feedback to BECP on user needs. FY 2006 was a record-breaking year for BECP's technical assistance and training.

Website Use Soars

The BECP website, www.energycodes.gov, averaged more than 3.0 million hits per month in 2006, which is up from almost 2.0 million per month in FY 2005 – an increase of over 50 percent. The website serves as the main distribution portal for RES*check* and COM*check* desktop software tools, which averaged 10,000 downloads per month (compared to 8,000 downloads per month in FY 2005). The desktop tools are now used to generate over 3,000 compliance reports per month from over 16,000 registered users. Visits to BECP's four Web-based applications – RES*check*-Web, COM*check*-Web, RES*check* Package Generator, and COM*check* Package Generator – were 28 percent higher than last year (70,656 visits in FY 2006 versus 55,209 in FY 2005). The popularity of the website also reflects increased use of Web-based training and videos as well as increased use of the Resource Center.

Setting the Standard Keeps Readers Current

Subscriptions to *Setting the Standard* newsletter, delivered electronically to subscribers on a quarterly basis, climbed by 22 percent (88,683 subscribers in FY 2006 compared to 72,556 in FY 2005). *Setting the Standard* is a key instrument in information exchange for building industry professionals, state and local code officials, and other interested parties, often providing late-breaking energy code information.

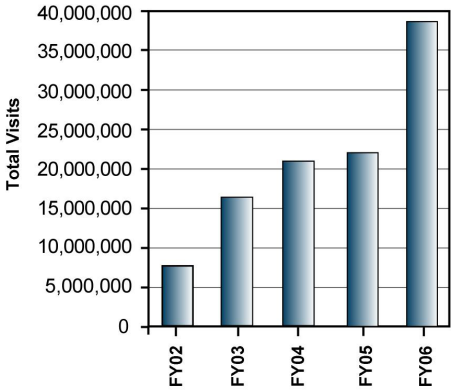
User Support Shows Steady Increase

BECP's User Support Service responded to 3,903 inquiries and 175 product requests – 59 percent more than in FY 2005 (2,389 inquiries and 171 product requests). The success and popularity of BECP's training webcasts contributed to the increase in assistance to users, spurring questions on software, technical aspects of the code, and code compliance for residential and commercial buildings.

Media and Outreach Efforts Expand

In FY 2006, BECP reached more than 315,000 trade and professional media readers with information on building energy codes as well as BECP products and services; examples follow.

- A cover story in *EC&M* (Electrical Construction and Maintenance) magazine focused on the lighting requirements of the IECC and ASHRAE Standard 90.1 as well as energy code resources offered by BECP.



Website hits grew steadily over the last five fiscal years.

- Articles were published in *Home Energy* magazine and in NASEO News (National Association of State Energy Officials) about the 2006 IECC and associated BECP training.
- Announcements in *Lighting Design and Application* magazine, GreenBiz.com, Lighting.com, and *Building Design and Construction* magazine detailed BECP's online training and energy code resources.
- An information piece titled "The Latest in Exterior Lighting Power Requirements in the National Energy Codes: ASHRAE/IESNA 90.1-2004 and IECC 2006" was distributed at conferences and training sessions.

Training Extends its Reach

FY 2006 saw BECP's training efforts grow substantially in terms of numbers trained and the nature and flexibility of training opportunities. BECP offered Web-based and stand-up training at conferences, which reached more than 7,500 attendees, a significant increase over the FY 2006 goal of 2,000 persons trained. Participants value this training, with 90 percent of respondents rating BECP training as very good or excellent. Energy code training through DOE Regional Offices/ National Energy Technology Laboratory and State Energy Program grants reached another 12,000. Some highlights of the year's training activities follow.

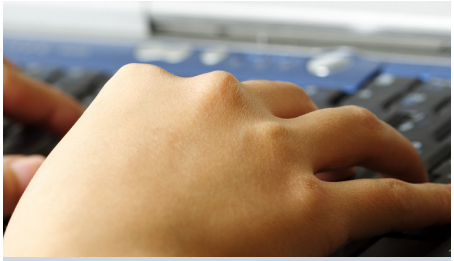
Live, Web-Based Training

By using the latest in Web-based technology, BECP delivered training to more than 6,500 participants during 10 webcast training sessions. Webcasts typically involve 60 minutes of presentation followed by a 30-minute question and answer session.

WINNER 2006 APEX® AWARDS FOR PUBLICATION EXCELLENCE

Energy Code Resource Center Earns National Award

The Building Energy Code Resource Center, an online reference tool full of articles, images, and presentations on commercial and residential energy efficiency, received a website Award of Excellence in the APEX 2006 Communications Competition. This national award recognizes excellence in graphic design, editorial content, and the ability to achieve overall communications excellence. In FY 2006, new content was added to the Resource Center, including information on topics such as the commercial building tax deduction for energy-efficient lighting and new Code Notes, which are detailed discussions of specific energy-efficient building techniques. A goal of the Resource Center is to link users with Web content from sources such as ENERGY STAR®, Building America, and model code groups. In FY 2006, the Resource Center directed thousands of hits per month to these and other resources.



Continuing Education Credits

BECP coordinated with the AIA and ICC to offer continuing education credits for self-paced online training, for live training events, and for those who view a recorded webcast in video format.

These webcasts are also available for viewing at BECP's website. Examples include:

- **Commercial Requirements of the 2006 IECC** – a three-part webcast that addressed envelope, mechanical, and lighting and drew a combined audience of more than 3,800 participants
- **IECC Residential Code Training** – a session hosted by BECP on two occasions that drew a combined audience of over 1,700 participants
- **Log Homes in RES*check*** – a topic repeatedly requested from software users that drew 47 participants
- **Advanced Lighting Design and the Energy Code** – a topic of interest to many COM*check* users that attracted 78 viewers
- **Using the Alterations Feature for Standard 90.1 in COM*check*** – a popular session that attracted 846 viewers.

Training Videos

BECP's live, Web-based training events are captured via video and placed on the BECP website for viewing by those who were unable to attend the event or who would prefer to watch the taped event at their leisure. Viewings of these videos steadily increased during FY 2006 to over 700 views per month by September 2006.

Conferences

BECP also attended trade conferences where they delivered training to more than 700 participants and offered compliance and training tools. Examples include:

- **LightFair International** – held in Las Vegas, Nevada, BECP provided a three-hour training session titled "Lighting Energy Code and Compliance" to an audience of 75, and BECP distributed 300 CheckMate CDs as well as provided hands-on software training and code assistance to attendees on request
- **ICC Expo** – held in Orlando, Florida, BECP distributed 187 CheckMate CDs and 100 Code Notes as well as provided hands-on software training and code assistance to attendees on request.

Self-Paced Online Training

To serve even more users, BECP developed four self-paced online training modules, including:

- **Codes 101** – provides a basic understanding of adoption, implementation, and enforcement of energy codes and standards, as well as voluntary energy efficiency programs
- **RES*check* 101** – provides an overview of RES*check* software use to comply with the 2003 IECC
- **COM*check* 101** – provides an overview of COM*check* software use to comply with the 2003 IECC
- **Area Takeoffs 101** – covers helpful hints for calculating the square footage of envelope components, explains the building envelope concept, and offers instructions and examples.

National Workshop on State Building Codes

In Denver, Colorado, the BECP-organized workshop set an all-time high attendance record of 258, including architects, builders, code officials, energy code advocates, industry and/or trade associations, and model code organizations. Workshop participants represented energy-related organizations in 35 states and territories. BECP also conducted pre- and post-workshop training sessions that attracted 270 attendees.

Building Codes Assistance Project Contributes to Code Adoption

The Building Codes Assistance Project helps states and local jurisdictions build support for the adoption of more stringent building energy codes.

Technical Assistance Supports States' Efforts

On request, BECP provides direct technical assistance to states and local jurisdictions to help them adopt, implement, and enforce building energy codes. Examples of technical assistance provided to states in FY 2006 follow.

- **Louisiana** – BECP assisted with Hurricane Katrina reconstruction efforts by coordinating with the Louisiana State Energy Office to host a live Web-based presentation on the Louisiana Energy Code and COM*check* at the Louisiana State University Center for Energy Studies. BECP followed up with three additional trainings via webcast to answer questions live from the initial recorded training session.
- **Michigan** – BECP calculated the kilowatt-hour and megawatt savings of upgrading Michigan's commercial lighting requirements from ASHRAE Standard 90.1-1999 to ASHRAE Standard 90.1-2004.
- **Montana** – BECP analyzed the energy impacts of adopting the 2006 IECC as the commercial building code. Energy modeling was done on the impact of removing all below-grade (and non-heated) slab insulation requirements. BECP also analyzed the differences between the current Montana residential code and the 2006 IECC for residential buildings.
- **West Virginia** – BECP calculated the energy impacts of updating West Virginia's existing state energy code for residential buildings to the 2003 IECC.

Building Energy Codes
U.S. Department of Energy

CONTACT INFORMATION

BECP Website:
www.energycodes.gov

Tech Support:
www.energycodes.gov/support/helpdesk.php

RES*check*™ and **COM*check*™** can be downloaded for free directly from the website.

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